ENERGY WEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

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P.O. Box 310
15 North Main Street
Huntington, Utah 84528

June 5, 2012

Hand Delivered

Utah Coal Program
Utah Division of Oil, Gas, and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Subj: Clean Copy Submittal for the Des Bee Dove Mine , Mid-Term Review, PacifiCorp, Des Bee Dove Mine, C015/0017, Task ID #4080, Emery County, Utah

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company "Energy West" as mine operator, hereby submits clean copies for finalizing the Des Bee Dove Mine Mid-Term review.

Eight (8) complete clean copies of the pages within the MRP are submitted for Division certification. A C2 form is included for organization of removal or replacement of items into the Des Bee Dove MRP and including Volume 8. If you have any questions concerning this action, please contact myself at 435-687-4712 or Dennis Oakley at 801-220-4607.

Sincerely,

for Dennis Oakley
Kenneth Fleck
Geology and Environmental Affairs Manager

Cc: file

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JUN 05 2012
DIV. OF OIL, GAS & MINING

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: PacifiCorp
Mine: Des Bee Dove Mine **Permit Number:** C/019/0017
Title: Clean Copy Submittal for the Des Bee Dove Mine , Mid-Term Review, PacifiCorp, Des Bee Dove Mine, C015/0017, Task ID #4080, Emery County, Utah

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☒ Replace	☐ Remove	Volume 8, replace entire text section.
☐ Add	☒ Replace	☐ Remove	Volume 2, Part 3, Page 3-7, replace page.
☐ Add	☒ Replace	☐ Remove	Volume 1, Introduction Section, replace entire section
☐ Add	☐ Replace	☐ Remove	
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.

Received by Oil, Gas & Mining

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JUN 05 2012
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PacifiCorp, Energy West Mining Company

C/015/0017

Clean Copy Submittal for the Des Bee Dove Mine, Mid-Term Review

Volume 1, Introduction Section:

Replace entire Section

The information found in the following pages and volumes may not reflect the current conditions of the Des Bee Dove Mine operations, but will remain as historic information. Final reclamation of the last area (sedimentation pond) of the Des Bee Dove Mine was completed in 2006. Phase I bond release was accepted in 2007. The Permittee no longer monitors for water quality, soils, air quality, or subsidence. Vegetation monitoring is the last and only parameter left to monitor at the Des Bee Dove Mine. The 10 year responsibility period will conclude in 2013. If monitoring shows that revegetation has met the stated performance standards, the Permittee will apply for Phase III bond release of the entire mine site.

Introduction

PacifiCorp owns and leases certain fee coal lands, together with assigned federal and state coal leases, and controls approximately 25,000 acres of contiguous minable property located in Emery County, Utah.

Geography, the area is known as East Mountain, a large, relatively flat plateau, containing two mineable coal seams.

Mining began as early as 1898 in the unnamed canyon where the Des Bee Dove Mine is

located. The original mine workings, called the Griffith Mine, were limited in extent due to the rugged terrain and poor access. The Griffith workings were purchased in 1936 by two men, Edwards and Broderick, who fashioned a crude access road and mine until 1938.

Castle Valley Fuel Company purchased the Edwards and Broderick property in 1938. The LDS Church purchased coal lands adjacent to Castle Valley Fuel Company in 1938 and began their operations in that year.

The Church Mine operated under contract to a Mr. Killian of Orangeville until it was closed in 1943 due to World War II. Castle Valley Fuel Company continued to operate until 1947. The LDS Church purchased Castle Valley Fuel's operation in 1947 and combined operations to form Deseret Coal Company, a church welfare project. Deseret Coal Company continued operations until Utah Power & Light Company acquired it in 1972.

During mine operations, mining could take place from one or more of three main portals; Deseret, Beehive and Little Dove. Hence the name Des Bee Dove Mine. Mine personnel and coal handling facilities were combined to service all three portals. Location of the mine permit boundary is shown on Figure 1.

Two minable seams exist in the Des Bee Dove Mine area. Hiawatha (lower) Seam was mined through Deseret portal. Blind Canyon (upper) Seam was mined through Beehive and Little Dove portals.

On February 6th, 1987 the Des Bee Dove Mine was temporarily idled. On February 26, 1997, PacifiCorp submitted a Notice of Intent to reclaim the Des-Bee-Dove Mine. In

1998, the Division accepted Phase III bond release on the haul road (93.18 acres). This area was transferred to the Emery County road system. In 1999 PacifiCorp initiated final reclamation using a multi-faceted approach. The following list outlines the projects completed:

Reclamation Completed or Scheduled Projects

- ✓ Surface Facility Demolition Project: Initiated and completed in the fall of 1999.
- ✓ Maple Gulch Remote Portals: Final reclamation completed in July 2000.
- ✓ Pumphouse Area: Final Reclamation completed in the fall of 2000.
- ✓ Tipple Valley Fill Removal Project: Excavation initiated in March 2001, project completed May 2001.
- ✓ Phase 1 Reclamation - Little Dove/Beehive Area: Completed May 2002.
- ✓ Phase 2 Reclamation - Deseret and Tipple Area: Completed June 2003.
- ✓ Phase 3 Reclamation - Sediment Pond: Completed January 2006.

In February 2007, Phase I bond release was accepted by the Division for the Phase 1 Area, Phase 2 Area, and the Pumphouse Area. In April of 2007, Phase III bond release was accepted by the Division for a portion (0.9 acres) of the Phase 2 Area and the Pumphouse Area. In September, 2009, Phase I bond release was accepted by the Division for the remote portals; Deseret Mine Portal and Beehive Mine Portal, and the Phase 3 Area (sediment pond).

Organization of the Historic Mining Permit Application

The following volumes contain PacifiCorp's historic permit application for underground coal mining operations at the Des-Bee-Dove Coal Mine. The application is organized into a set of separate volumes as follows:

Volume 1

Introduction

Table of Contents

Part 1 - Legal , Financial, Compliance Information (refer to supplemental volume entitled "Supplemental Volume, Legal and Financial Information")

Part 2 - Environmental Resources

Volume 2

Part 3 - Mining Operation Plan

Part 4 - Reclamation Plan

Reclamation Plan Revised in Separate Projects/Phases:

Remote Portals: Maple Gulch Area (refer to Volume 2 Part 4 Appendix IX)

Pumphouse Area (refer to Volume 5 Appendix IV)

Phase 1 Little Dove/Beehive Mine Area (refer to separate binder Appendix XIV)

Phase 2 Deseret Mine, Bathhouse Area and Access Road (refer to separate binder Appendix XV)

Phase 3 Sediment Pond and Access Road (refer to separate binder Appendix XVI)

Volume 3

Maps and Drawings

Volume 4

Maps and Drawings

Volume 5

Appendices

I	Coal Lithologic Logs
II	Field Data for the Vegetation Reference Areas
III	Stability Analysis - Sedimentation Pond and Haul Road
IV	Pumphouse Reclamation Plan
V	Underground Development Waste Plan
VI	Blasting Plan
VII	Sedimentation Pond Criteria and Calculations
VIII	Sedimentation Pond Construction Drawings
IX	Photographs of Existing Facilities
X	Deseret Waste Dump Stability Analysis
XI	Slope Stability Analysis - Bathhouse Fill
XII	Hydrologic Procedures and Calculations for the Sedimentation and Surface Drainage Collection System
XIII	Subsidence Monitoring Plan
	Supplemental Information (Permit Area Reduction October 2000)
XIV	Phase 1 Little Dove/Beehive Mine Area (refer to separate binder Appendix XIV)
XV	Phase 2 Deseret Mine, Bathhouse Area and Access Road (refer to separate binder Appendix XV)

XVI Phase 3 Sediment Pond and Access Road (refer to separate binder Appendix XVI)

Volume 6

Appendices Continued

XVII Sedimentation Pond Access Road Plans and Written Text

XVIII Haul Road Reclamation Study

Volume 8

Geology Section (C/015/017, C/015/018, C/015/019)

Volume 9

Hydrologic Section (C/015/017, C/015/018, C/015/019)

PacifiCorp, Energy West Mining Company

C/015/0017

Clean Copy Submittal for the Des Bee Dove Mine, Mid-Term Review

Volume 2, Operation Plan:

Replace page 3-7

constructing seals. These seals will be constructed in accordance with MSHA regulations.

Upon final extraction of the mine, portal seals will be constructed. Prior to any construction, however, BLM officials will be notified and approval obtained.

MINING METHOD

Due to geologic constraints, Des Bee Dove Mine is limited strictly to room-and-pillar methods employing continuous mining units. (Portals permanently sealed in 1987. Final Reclamation of mine site completed June 2003. Mining operations no longer exist)

Figure 2 illustrates the basic configuration of the main entries. A six-entry system is planned for the main headings with openings driven 20 feet wide on 80 foot centers. The pillars created thereby measure 60 feet by 80 feet, a size which, has proven sufficient to control mining induced overburden stress.

For development of room-and-pillar sections at Des Bee Dove Mine, three to five entries will be opened on advance with two or more developed on retreat in conjunction with pillar extraction. Openings are 20 feet wide on 50 foot x 100 foot centers. The sequence of pillar recovery is shown in Figure 3 (near the end of advance and beginning of retreat and pillaring). Figure 4 shows in detail the method planned for recovering individual pillars. (Refer to Appendix II, Part 3, Fig. 2 to 6)

Figure 6 indicates that at 60% pillar recovery, leaving a foot of top coal, results in just over 50% coal recovery for the mining configuration planned at Des Bee Dove.

MINE PRODUCTION

PacifiCorp, Energy West Mining Company

C/015/0017

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Volume 8, East Mountain Geology Volume:

Replace entire text section

GEOLOGY OF EAST MOUNTAIN MINE PLAN AREAS (R645-301-600)

The East Mountain property is located in the central portion of the Wasatch Plateau Coal Field in Emery County, Utah (Figure G-1). Generally, this area is a flat-topped mesa surrounded by heavily vegetated slopes which extend to precipitous cliffs leading to the valley below. The plateau has a vertical relief of up to 2,500 feet, rising from Castle Valley below. The following discussion summarizes the structural geology, stratigraphy, and economic coal deposits of the region and the mine plan areas located within the East Mountain property.

DATA COLLECTION

Applicant has been collecting data regarding the East Mountain property and adjacent area since 1971. As a result, over 110 exploration drill holes wherein data were collected regarding the coal seams and enclosing strata (see Map EC-10424-EM) have been completed from the surface. Nine of the holes were core drilled through the coal zone and all were geophysically logged. Usually, the surface holes are located on about ¼ to ½ mile centers. In addition to these holes, over 200 holes which provide valuable data on as close as 500 foot centers have been drilled from within the mines.

The coal seams exposed on outcrop and within the mine workings have been mapped in detail providing data which is valuable in understanding the coal geology.

The interpretations made herein are based on data collected from all of the above sources in addition to the published regional data. All of these data allow the construction of a geologic model which represents the conditions present in the mine plan and adjacent areas.

The applicant has made a practice of submitting to the BLM, each year, copies of both lithologic and geophysical logs of all drill holes, surface and underground, drilled within federal leases or on fee land. This practice will continue throughout the lifetime of the mining permit.

STRUCTURE

The geologic structure of the area is fairly simple. The strata are gently down-folded in the area of the Straight Canyon Syncline which is present in the northern portion of the property (see maps CE-10693-EM and CE-10694-EM). Dips in the syncline range from two to six degrees with the north limb dipping the steepest.

In the area south of the Straight canyon Syncline the coal seams dips gently in the northwest direction toward the syncline; however, to the northwest of the Straight

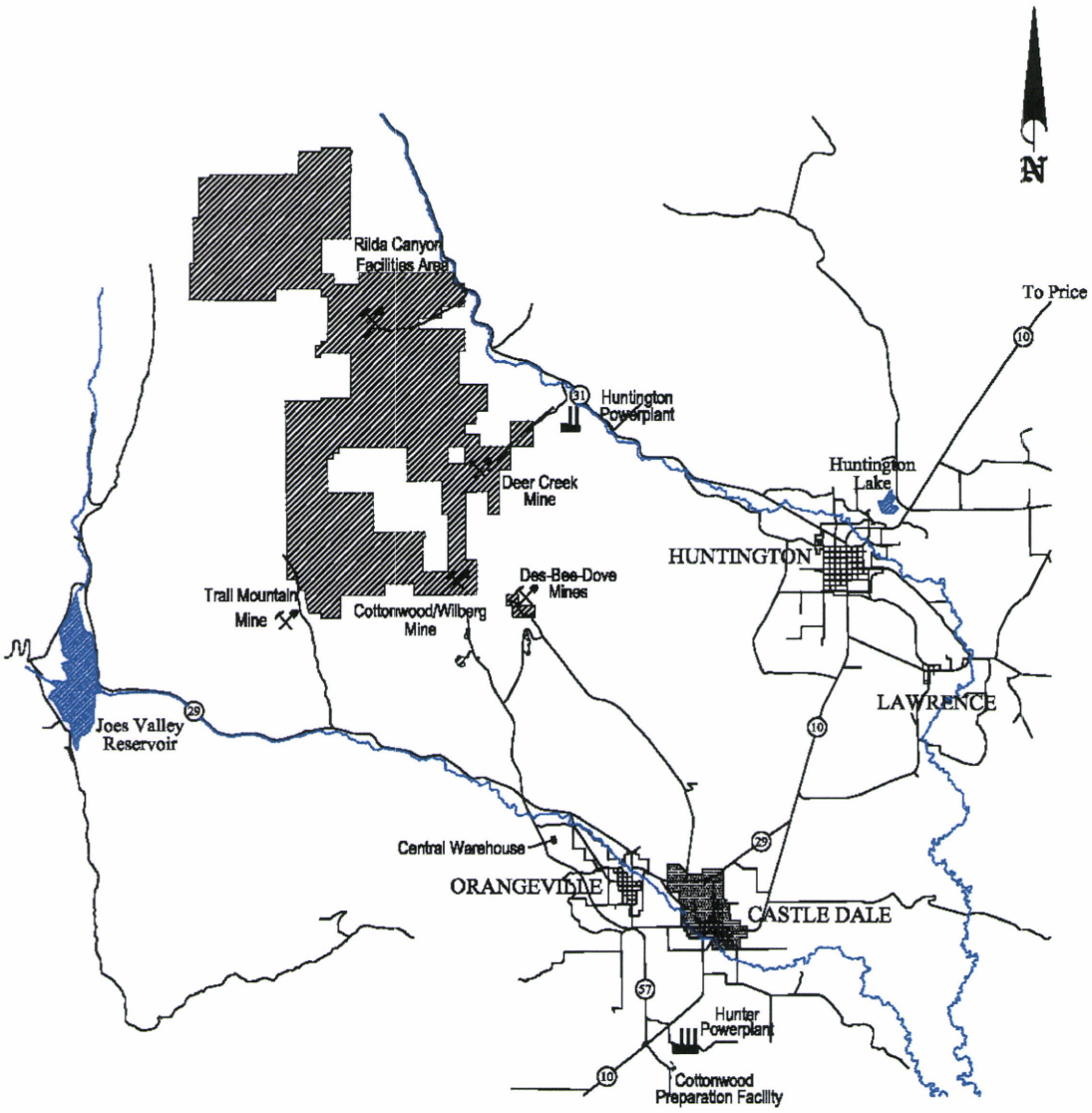

FIGURE G-1: EAST MOUNTAIN MINING PROPERTY LOCATION MAP

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Canyon Syncline both the Hiawatha and Blind Canyon seams dip in a southeast direction at three to five degrees. The dip and strike of the coal seams can be better visualized on maps CE-10693-EM and CE-10694-EM which are included herein.

FAULTING

The strata within the property have been offset by a series of north-south trending fault zones. Generally, the faults are nearly vertical and do not have significant amounts of fault gouge or drag associated with them. One of the major faults present in the region, Pleasant Valley Fault, has been intersected in both the Deer Creek and Wilberg mines (refer to Map CE-10694-EM).

The Pleasant Valley Fault consists of two parallel fractures about 150 feet apart (see Map CE-10694-EM and Cross-Section CE-10244-EM). The fault's total displacement, where it was intersected in the Deer Creek Mine, to the north is 150 feet with its downthrown side on the east. The displacement diminishes to less than one foot where it was intersected in the Wilberg Mine near the south end of the property.

Another north-south trending fault, the Deer Creek Fault, is present to the east of the Pleasant Valley Fault. It limits the eastward development of the Wilberg/Cottonwood and Deer Creek mines. The displacement of the Deer Cree Fault ranges 100 to 170 feet with the east block being downthrown.

A northeast-southwest trending fault system, the Roans Canyon Graben, is present along the axis of the Straight Canyon Syncline. The system contain up to six normal faults having displacements ranging from a few feet to over 150 feet. Coal deposits present to the north of the fault were accessed through rock tunnels being driven from the 3rd North section of the Deer Creek Mine. The Roans Canyon Graben forms a major aquiclude to the southward migration of groundwater and is discussed in greater detail in Volume 9, Hydrology of East Mountain.

JOINTING

The jointing in the coal's overburden plays an important factor in how the rock will react when it is undermined. Because of this, the joint systems in the Castlegate Sandstone outcrops exposed in the southern end of East Mountain and in Rilda Canyon were mapped. In the southern end of East Mountain the dominant joint trend is N52°W with a secondary trend in a N80°E direction. In the Rilda Canyon area the strongest joint trend is north-south with a very weak trend in a N80°W direction (see maps CE-10870-EM and CE-10790-EM). This data should play an important role in understanding how the Castlegate cliffs will react when undermined and will be incorporated into a predictive model designed to forecast how the cliffs will respond to mining.

STRATIGRAPHY

The rock formations exposed in the East Mountain area range from Upper Cretaceous to Tertiary in age (see Figure G-2). The formations, in ascending order, are the Masuk Shale member of the Mancos Shale, Starpoint Sandstone, Blackhawk, Castlegate Sandstone, Price River, North Horn, and Flagstaff formations. The coal deposits are restricted to the lower portion of the Blackhawk Formation.

The Masuk Shale is the upper member of the Mancos Shale and consists of light to medium gray marine mudstones. Usually this formation weathers readily, forming slopes which are often covered by debris. It is generally devoid of water.

Overlying and inter-tonguing with the Masuk Shale is the Starpoint Sandstone. In the East Mountain area the Starpoint consists of three or more cliff-forming massive sandstones totaling about 400 feet in thickness. Generally, the sandstones are fine to medium-grained and moderately well-sorted. The upper contact of the Starpoint is usually quite abrupt and readily identifiable on the outcrop. Locally, the Starpoint Sandstone exhibits aquifer characteristics. This formation is the first aquifer found below the coal seam to be mined. Its hydrologic characteristics are discussed in detail in Volume 9, Hydrology of East Mountain.

The Blackhawk Formation consists of alternating mudstones, siltstones, sandstones, and coal. Although coal is generally found throughout the Blackhawk Formation, the economic seams are restricted to the lower 150 feet of the formation. The sandstones contained within the Blackhawk Formation are fluvial and increase in number in the upper portions of the formation. Many of the tabular sandstone channels form local perched water tables. The total thickness of the Blackhawk Formation in the East Mountain area is about 750 feet.

The Castlegate Sandstone generally caps the escarpment which surrounds the eastern limit of the mine plan area. The Castlegate consists of about 250 feet of coarse-grained, light gray, fluvial sandstones; pebble conglomerates; and subordinate zones of mudstones. Although the sandstone is very permeable, it lacks water because of insufficient recharge.

The Price River Formation overlies the Castlegate Sandstone. The formation is about 350 feet thick and forms slopes which extend upward from the Castlegate escarpment. Although some mudstones are present, fine-grained, poorly sorted sandstones dominate the Price River Formation. The Price River Formation generally lacks water.

Utah Geological and Mineralogical Survey Monograph Series No. 3. 1972

Figure G-2

Stratigraphy of East Mountain
(Doelling, 1972)

System	Series	Stratigraphic Unit		Thickness (feet)	Description
TERTIARY	Eocene	Green River Formation		-	Chiefly greenish lacustrine shale and siltstone.
		Wasatch Group	Colton Formation	300 -1,500	Varicolored Shale with Sandstone and limestone lenses, thickness to the north.
	Paleocene		Flagstaff Limestone	200 - 1,500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale, and volcanic ash, ledge former.
			North Horn Formation (Lower Wasatch)	500 - 2,500	Varigated shales with subondinate sandstone, conglomerate and freshwater limestone, thickens to north, slope former.
CRETACEOUS	? Maestrichthian	Mesaverde Group	Price River Formation	600 - 1,000	Gray to white gritty sanstone interbedded with subordinate shale and conglomerate, ledge and slope former.
	Campanian		Castlegate Sandstone	150 - 500	White to gray, coarse-grained often conglomeratic sanstone, cliff former, weathers to shades of brown.
			Blackhawk Formation ***MAJOR COAL SEAMS***	700 - 1,000	Yellow to gray, fine- to medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick *coal* seams.
			Star Point Sandstone	90 - 1,000	Yellow-gray masive cliff-forming sandstone, often in several tongues separated by Masuk Shale, thickens westward.
	Santonian	Mancos Shale	Masuk Shale	300 - 1,300	Yellow to blue-gray sandy shale, slope former, thick in north and central platear area, thins southward.
			Emery Sandstone ***COAL (?)***	50 - 800	Yellow-gray friable sandstone tongue or tongues, cliff former, may contain coal (?) in south part of platear if mapping is correct, thickens to west and south. *Coal* may be present in subsurface to west.
	Coniacian		Blue Gate Member	1,500 - 2,400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hill and badlands, thickens northerly.
	Turonian		Ferron Sandstone Member ***MAJOR COAL SEAMS***	50 - 950	Alternating yellow-gray sandstone, sandy shale and gray shale with important *coal* beds of Emery coal field, resistant cliff former, thickens to south.
	Cenomanian		Tununk Shale Member	400 - 650	Blue-gray to black sandy marine slope forming mudstone.
	Albian	Dakota Sandstone *MINOR COAL*		0 - 60	Variable assemblages of yellow-gray sandstone, conglomerate shale and *coal*. Beds lenticular and discontinuous.

Generalized section of rock formations, Wasatch Plateau coal field.

The North Horn Formation is about 850 to 900 feet thick in the East Mountain area. Mudstones dominate the rock types present and are generally gray to light brown in color. Localized, lenticular sandstone channels are present throughout the formation. The sandstone beds are more common near the upper and lower contacts of the formation and many times host localized perched water tables.

The Flagstaff Formation is the youngest formation exposed in the mine plan area and consists of white to light gray lacustrines limestone. An erosional remnant of 100 to 150 feet of this formation remains, forming a cap on the highest plateaus. The formation is fairly well fractured, allowing surface water to percolate down to lower strata.

ECONOMIC COAL OCCURRENCES

Three economic coal seams are present within the mine plan area: the Hiawatha, the Cottonwood, and the Blind Canyon seams. The current workings of the Cottonwood/Wilberg Mine are located in the basal, or Hiawatha, seam.

The Hiawatha Seam is of mineable thickness in both the southern and extreme northern portions of the East Mountain property (see Map CE-10695-EM). The seam rests directly on the Starpoint Sandstone and ranges in thickness from sixteen (16) feet to less than five (5) feet. The Hiawatha Seam is not present throughout a major portion of the property. This lack of coal is due to a major distributary river channel which flowed through the coal swamp in an easterly direction.

The Blind Canyon Seam, the second major mineable seam within the East Mountain mine plan area, is located from fourteen (14) to 140 feet above the Hiawatha Seam (see Map CE-10691-EM). The average separation between the seams is seventy to eighty (70-80) feet but increases up to 140 feet in the southern portion of the property. The Blind Canyon Seam is of mineable thickness through most of the property and is mined through the Deer Creek Mine. The seam ranges in thickness from sixteen (16) feet to less than five (5) feet (see Map CE-10696-EM). The seam thin to less than five (5) feet in the southwest portion of the property.

The Cottonwood Seam is located stratigraphically between the Hiawatha and Blind Canyon seams. The seam is located generally about seventy (70) to ninety (90) feet above the Hiawatha Seam (see Map CE-10692-EM) but is found in mineable thickness only in the south half of lease U-47978 where it reaches up to sixteen (16) feet in thickness. The seam is extensively burned on outcrop. Heat released from the burn has elevated the temperature of the strata to above 250° Fahrenheit in some areas. Because of its high temperature, the Cottonwood Seam reserves are not mineable

using current technology. Data indicate that the burn is currently inactive despite the high temperatures.

OVERBURDEN

The coal reserves in the East Mountain mine plan area within the Hiawatha Seam are covered by up to 2,300 feet of overburden. Because the topography of the lands displays much relief, the thickness of the overburden is highly variable (see Map CE-10703-EM) and cross-section CE-10244-EM). The overburden is the greatest in the western and northern portions of the property where the plateau is capped with the Flagstaff Limestone. In these areas the overburden ranges from 2,200 - 2,300 feet; however, the overburden above most of the coal is less than 1,800 feet.

The overburden above the Blind Canyon Seam is depicted on Map CE-10704-EM. Its thickness ranges from less than 100 feet to 2,200 feet. The average overburden is 1,700 feet.

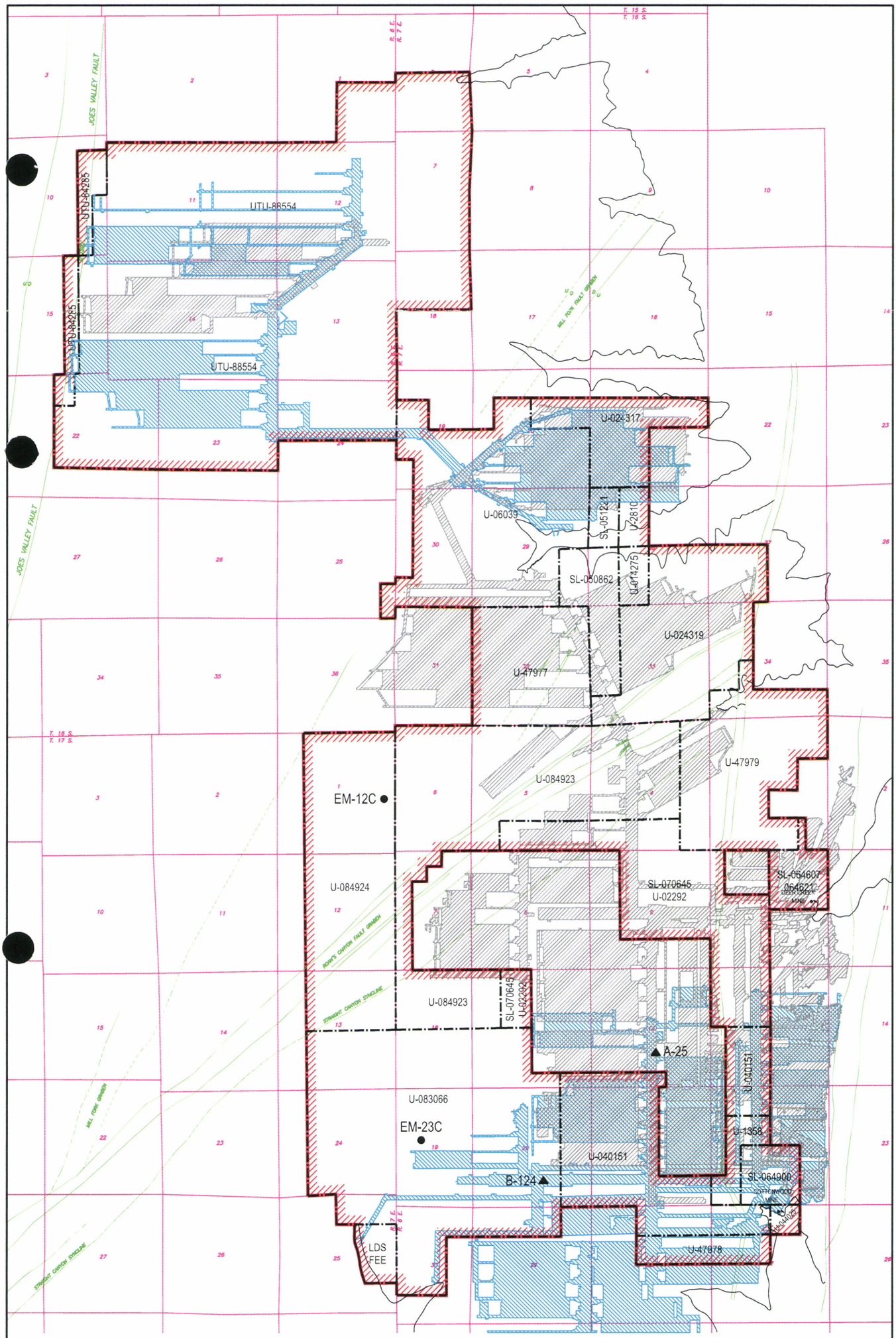
CHEMICAL COMPOSITION

In the development of the Applicant's mines and associated surface facilities, some of the strata and alluvium covering the coal seam was excavated to accommodate the facilities. In order to better understand the chemical and physical characteristics of the rock material that was excavated, over 130 samples from both outcrop and core from drill holes were analyzed.

Four drill holes were selected as data points in which core samples analyzed for their chemical and physical properties (see Figure G-3). The core drill holes were selected to give the best representation of the same rock sequence which was excavated at the Wilberg Mine portals. Two of the holes were drilled from the surface of East Mountain (EM-12C and EM-23C), and two of the holes were drilled from within the Deer Creek and Wilberg mines (A-25 and B-124).

Samples of rock core were collected from each lithologic unit that was penetrated within the selected drill holes. The samples consisted of a representative section of core averaging 0.3 feet in length, usually taken from the center of each lithologic unit. Samples of rocks which were immediately overlain by mineable coal seams were collected at the coal seam contact. The rock zones sampled and the sample numbers are shown on the core logs for each drill hole (see core logs in Appendix).

In light of the recommendation made by the office of Surface Mining (OSM), each sample was analyzed for the following:



LEGEND

- FEDERAL LEASE BOUNDARY
- U-083066 FEDERAL LEASE NUMBER
- EAST MOUNTAIN LOGICAL MINING UNIT
- BLIND CANYON COAL SEAM
- HIAWATHA COAL SEAM
- EM-23C● DRILL HOLE
- B-124▲ IN-MINE DRILL HOLE
- FAULT (DASHED WHERE INFERRED)

CAD FILE NAME/DISK#: FIGURE G-3 DATA LOCATION MAP

ENERGY WEST MINING COMPANY
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DATA LOCATION MAP

DRAWN BY:	K. LARSEN	FIGURE G-3	
SCALE:	1" = 1 MILE	DRAWING #:	
DATE:	APRIL 18, 2012	SHEET 1 OF 1	REV. ___

pH	Alkalinity (equivalent $CaCO_3$)
EC (electrical conductivity	% Iron
% Calcium	% Zinc
% Magnesium	% Sulfate
% Sodium	% Molybdenum
SAR (Sodium Absorption Ratio	% Boron

All of the samples of carbonaceous mudstone that were collected were also analyzed for percent pyrite/marcasite content. The samples collected from immediately below a mineable coal seam were analyzed for clay content. In addition to these analyses, four or five representative samples of each of the rock types present --sandstone, siltstone, mudstone, interbeds (thinly laminated siltstone and mudstone), carbonaceous mudstone, and coal -- were crushed to a size of minus ¼" mesh and the product screened for percent send, silt, and clay content.

Front Range Labs, Inc. of Fort Collins, Colorado was selected to do the analytical work because of its expertise in testing chemical and physical properties of coal overburden and its ability to perform all of the required analytical work.

Applicant has previously established an excellent database regarding of the coal quality within the East Mountain mine plan area. Samples have been collected from within the Deer Creek and Wilberg mines. These samples were analyzed by Standard Laboratories, Inc. in Huntington, Utah. Some of the data reported herein have been gleaned from this work.

The findings of the analyses are separated by formation, rock type, and coal seam in Table G-1. The mean and standard deviations have been calculated for each of the various chemical and physical parameters for each rock type.

In general, the chemical content within a rock type is moderately consistent, as shown by the standard deviations. However, the sulfate content of the sandstones and siltstones is variable due to sulfate enrichment by groundwater in some of these rock types and not others.

The sulfur content in the Hiawatha, Cottonwood, and Blind Canyon seams averages 0.52% and generally ranges from 0.49% to 0.59%. Of this sulfur content, 79% is in the form of organic sulfur and 16% is in the form of pyritic including marcasite; the remainder is in the form of sulfate.

TABLE G-1
ANALYTICAL SUMMARY
OVERBURDEN ANALYSES

Lithology	Number of Samples		Chemical Tests												Physical Tests				Crushed Rock Texture
	Chemical Tests	Physical Tests	Ca Meq/L	Mg Meq/L	Na Meq/L	[1]SAR	Fe ppm	Zn ppm	SO_4-S ppm	Mo ppm	B ppm	pH (paste)	[2]E.C. mmhos/cm	Sat. %	[3]Pyrite FeS_2	Sand %	Silt %	Clay %	
Blackhawk Formation																			
Sandstone:	26	2																	Sandy Loam
Mean			4.37	8.18	2.13	1.05	8874.00	11.47	409.60	0.10	0.06	8.00	1.55	21.70	–	84.50	11.00	4.5	
S.D.			3.91	5.13	1.08	0.69	6672.00	9.70	353.10	0.00	0.06	0.96	0.89	3.36	–	0.71	1.41	2.12	
Siltstone:	24	5																	Sandy Loam
Mean			3.06	6.24	2.30	1.69	14512.88	38.26	464.41	0.10	0.18	7.88	1.41	20.81	2.3	71.60	17.80	10.6	
S.D.			2.63	7.23	2.78	3.72	8782.40	21.29	122.63	0.00	0.16	1.08	1.72	1.82	0	23.50	16.57	7.7	
Mudstone:	24	4																	Sandy Loam
Mean			3.12	3.13	4.79	4.28	11074.13	70.31	233.96	0.10	0.28	8.00	1.10	23.99	–	71.50	20.50	8	
S.D.			2.36	2.89	12.76	12.58	5350.17	79.99	275.10	0.00	0.23	0.31	1.12	4.88	–	13.77	15.20	3.56	
Interbeds:	15	3																	Loamy Sand
Mean			4.34	7.98	2.79	1.30	10982.13	21.58	346.95	0.10	0.12	8.05	1.58	20.56	–	75.33	17.00	7.67	
S.D.			3.13	6.37	1.05	1.36	6584.59	9.97	359.46	0.00	0.11	0.23	0.92	1.33	–	7.64	9.56	3.06	
Carbonaceous Mudstone	25	3																	Loamy Sand
Mean			6.19	6.51	3.70	2.40	9933.76	58.04	438.86	0.10	0.42	7.53	1.54	34.76	2.3	73.33	18.00	5.67	
S.D.			4.85	8.42	4.85	3.98	6112.12	38.94	378.81	0.00	0.34	0.85	1.14	9.94	3.29	20.60	16.82	1.53	
Coal (Blind Canyon)	8	0													Sulfur (%)				
Mean			1.55	1.81	1.68	1.63	2089.38	10.19	103.88	0.10	0.06	8.00	0.36	60.66	0.44				
S.D.			0.59	2.88	1.35	1.27	2557.56	8.82	66.88	0.00	0.05	0.25	0.05	18.59	0.06				
Coal (Hiawatha)	2	0																	
Mean			1.52	2.85	1.41	1.58	2532.41	10.82	97.32	0.10	0.12	7.95	0.34	60.24	0.51				
S.D.			0.66	3.64	0.95	1.18	2718.02	8.41	72.14	0.00	0.21	0.24	0.07	16.84	0.06				
Coal (Cottonwood)	1	0																	
Mean			2.50	3.30	0.47	2.21	465.00	55.00	321.00	0.96	0.43	7.40	1.40	21.86	0.49				
S.D.															0.07				
Starpoint Sandstone																			
Sandstone:	11	4																	Sandy Loam
Mean			5.14	8.58	3.42	3.57	3798.00	9.47	1457.00	0.10	0.11	6.76	2.49	30.46	–	9.75	4.75	4.5	
S.D.			3.89	4.69	2.97	5.18	2965.00	6.98	2578.00	0.00	0.24	1.54	1.20	4.80	–	4.8	3.5	1.91	

The physical test which were completed on the samples indicate that all rock types present have the tendency to resist reduction of grain size when excavated and reclaimed, and only a minimum of clay-sized particles will be liberated. As may be expected, the coarser-grained rocks, sandstones, and siltstones produced much less clay-sized particles when crushed.

In addition to the aforementioned analyses of the general overburden, the strata immediately above and below the coal seam were analyzed for potential alkalinity and pyrite/marcasite content. The strata immediately below the coal were analyzed for clay content as well. The results of the test are as follows:

Zone Sampled	Number of Samples	pH	% FeS_2 Pyrite/Marcasite)	% Clay	Potential Alkalinity (equivalent $CaCO_3$, Mg/L)
Hiawatha Seam Roof	3	7.8	3.3	----	218,400
Hiawatha Seam Floor	3	7.5	1.3	5.5	127,300
Cottonwood Seam Roof	2	7.8	0.5	5.2	222,200
Cottonwood Seam Floor	1	8.7	0.4	10.5	70,200
Blind Canyon Seam Roof	2	8.1	0.5	----	252,600
Blind Canyon Seam Floor	3	8.3	1.3	9.0	3,500

The analyses of the overburden samples tested clearly show that no toxic or hazardous materials are present. The material excavated near the portal site is slightly alkaline. Generally, the soils in the region which are derived from the strata tested are alkaline as well. The overburden material which has been excavated will not degrade the quality of the soils in the area of the ground water percolating through this material.

LOCATION OF GAS OR OIL WELLS

There is one gas well located within the East Mountain mine plan area. It is located in Section 23, T. 16 S., R. 6 E. and within lease UTU-88554. The well (Mountain Unit 32-23) is owned and operated by Merit Energy Co. and is a producing well. Total depth of this hole is 7,476', and the hole is completed in the Ferron Sandstone. Several gas wells have been developed in Cottonwood Canyon to the west and Huntington Canyon to the Northwest of the mine plan area. The proposed mining activities will have no affect on the existing wells nor will the wells in any way affect the mining.

EXPLORATION DRILL HOLE WELL ABANDONMENT

Exploration drill holes completed on the property have been abandoned in accordance with the specifications of the Bureau of Land Management, Mineral Management Agency. In these holes all water and coal zones have been sealed off by placing a cement column in the drill hole. Surface and intermediate casing used has been pressure grouted in place forming a cement seal between the casing and the wall of the hole. This procedure effectively protects the hydrologic conditions of East Mountain and will be followed in the abandonment of all drill holes in the future.

SUBSIDENCE MONITORING

Subsidence monitoring plans are found in each of the existing mining and reclamation plans for Cottonwood/Wilberg, Deer Creek, and Des Bee Dove mines. The list below outlines the location of each plan.

Cottonwood/Wilberg Mine:

Volume 7, Appendix XVI

Deer Creek Mine:

Volume 3a, Appendix X and XI
Volume 11, R645-301-500
Volume 12, R645-301-500

Des Bee Dove Mine:

Volume 5, Appendix XIII, Tab Volume I, Part 1, Appendix F

(note: final reclamation was completed on the Des Bee Dove mine complex in 2003. Subsidence monitoring is no longer conducted for this mine. Federal leases encompassed within the Des Bee Dove mine complex have been approved by the BLM for relinquishment. The permit area has been reduced to include only the area surrounding the reclaimed disturbed area. There currently exists very limited underground mine workings within the boundaries of the permit area.)